

WHAT IS CLAIMED IS:

1. An essentially purified and isolated noggin polypeptide having an amino acid sequence as set forth in Figure 1 (Sequence I.D. No. 2) or a functionally equivalent amino acid sequence.
2. The human noggin polypeptide as claimed in claim 1, encoded by the DNA of hnog $\lambda$ -9 (deposited with the American Type Culture Collection under Accession No. 75310) or hnog $\lambda$ -10 (deposited with the American Type Culture Collection under Accession No. 75308) and fragments and derivatives thereof exhibiting noggin activity.
3. An isolated nucleic acid selected from a nucleic acid encoding a noggin polypeptide as claimed in claim 1, and substantially similar nucleotide sequences.
4. A nucleic acid as claimed in claim 3, which hybridizes to at least one nucleotide probe selected from the sequence of nucleotides 2 to 262 of Sequence I.D. No. 10 and the sequence:  
  
5' GARGGIATGGTITGYARCC (SEQ ID NO. 22).
5. A nucleic acid as claimed in claim 3, wherein said nucleic acid is isolated from a  $\lambda$  human placental genomic library.

6. A nucleic acid as claimed in claim 5, wherein said nucleic acid is isolated from a phage selected from hnogλ-9 (ATCC No. 75310) or hnogλ-10 (ATCC No. 75308).
7. A substantially purified nucleic acid as claimed in claim 3, encoding the human noggin polypeptide corresponding to Sequence I.D. No. 2.
8. A mutated variant of a nucleic acid as claimed in claim 3, which encodes a noggin agonist or antagonist.
9. A mutant noggin polypeptide which is a noggin agonist or antagonist obtainable by expression of a nucleic acid as claimed in claim 8.
10. An isolated nucleic acid which contains a nucleotide coding sequence for a noggin polypeptide as claimed in claim 1, in the anti-sense direction.
11. A phage selected from the group consisting of hnogλ-9 as deposited with the American Type Culture Collection and assigned Accession Number 75310 and hnogλ-10 as deposited with the American Type Culture Collection and assigned Accession Number 75308.

12. An expression vector comprising expression regulatory sequences operably linked to a nucleotide sequence which encodes noggin, wherein said nucleotide sequence is selected from the group consisting of:
- a) a nucleotide sequence which encodes the amino acid sequence set forth in Fig. 1 (SEQ I.D. NO. 2), and
  - b) sequences which hybridize to the sequence of (a) and encode a protein which promotes the induction of neural tissue.
13. An expression vector as claimed in claim 12, capable of directing expression of a functional noggin polypeptide in a eukaryotic host cell.
14. An expression vector as claimed in claim 13, wherein said host cell is selected from the group consisting of COS cells and CHO cells.
15. An expression vector as claimed in claim 12, capable of directing the expression of a functional noggin polypeptide in a prokaryotic host.
16. The expression vector as claimed in claim 15, wherein said host is E. coli.
17. An expression vector as claimed in claim 12, capable of directing the expression of a functional noggin polypeptide in a baculovirus

host.

18. Host cells transformed by an expression vector as claimed in claim 12.
19. A method of producing a noggin polypeptide which comprises culturing transformed host cells as claimed in claim 18, under conditions suitable for expression of said polypeptide.
20. A method as claimed in claim 19, wherein human noggin is produced in a form substantially free of proteins of non-human origin.
21. A pharmaceutical composition comprising a therapeutically effective amount of a polypeptide as claimed in claim 1, together with a pharmaceutically acceptable carrier.
22. A culture medium suitable for use in culturing nerve cells containing a noggin polypeptide as claimed in claim 1.
23. An isolated receptor which in vivo binds a noggin polypeptide as claimed in claim 1, or a fragment thereof retaining the binding site for said polypeptide.
24. An antibody which binds one or more noggin polypeptides as claimed in claim 1, but not other growth factors.

25. A hybridoma capable of producing a monoclonal antibody as claimed in claim 24.

26. The monoclonal antibody obtainable from hybridoma RP57-16.

27. Hybridoma RP57-16.

28. A hybridization probe suitable for detecting a nucleic acid as claimed in claim 3, having the sequence:

5'GARGGIATGGTITGYAARCC (SEQ I.D. NO. 22).

29. A noggin polypeptide as claimed in claim 1, for use in a method of treatment of a human or animal.

30. A method of treatment of a human or animal comprising administering a therapeutic dosage of a noggin polypeptide as claimed in claim 1, wherein said treatment is selected from the group consisting of regulation of cartilage and bone growth, therapy of a congenital condition or degenerative disorder of the nervous system, and treatment of damaged nerve cells.